MINES - A FORMIDABLE NAVAL WEAPON

I. Chernyshev

Naval Intelligence Support Center
Washington, D. C.

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DEPARTMENT OF THE NAVY
NAVAL INTELLIGENCE SUPPORT CENTER
TRANSLATION DIVISION
4301 SUITLAND ROAD
WASHINGTON, D.C. 20390

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During the Great Patriotic War, our Navy fulfilled its /41* duty to the Motherland with honor. This was facilitated by the high quality and skillful use of naval weapons, among which naval mines occupied an important place. Prior to the war, Soviet minemen developed mines unequalled in foreign navies. The offensive and defensive minefields they laid paralyzed enemy operations at sea, created an additional burden with the necessity of sweeping the mines, and etc. The Fascist navy lost a thousand transports and combatant ships to Soviet mines.

The development of mines in the prewar years was based on the rich experience of the Russian Navy, which initiated the creation and combat utilization of mines. It is well known that, toward the beginning of the First World War, the Russian Navy had the most developed mines in the world. In the years before the Great Patriotic War, utilizing the experience they had gained, Soviet minemen successfully perfected the naval mine and created a number of original surface-laid mines. Among them one can cite the M-26 and the KB (moored contact mines), which were intended for operations against surface ships and transports.

The experience of the war showed that naval mines were and remain a formidable naval weapon.

How does this naval weapon look and what are its characteristics? To begin with, one can see a naval mine only on dry land (at a depot, or in a museum), because in a normal combat situation it is hidden in the depths. "Lurking" at a certain distance from the surface of the ocean, or lying on its bottom, it "waits" until an enemy warship or transport

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approaches, so as to explode near them. Modern moored mines are, as a rule, metal spheres or cylinders with spherical bottoms, and with a diameter of up to 1 m and a length of up to 1.5 m. Bottom mines are metal cylinders with a diameter in most cases of about 0.5 m (though there are some over 1 m) and a length of up to 2.5 m. Inside the case, there is a powerful explosive charge weighing from 250 to 1000 kg and various devices: detonating fuze, mechanisms for laying at a prescribed depth, securing devices, etc.

Since a mine cannot be seen from a ship or vessel, its influence on them is characterized by surprise, and because of that the crew often cannot take effective measures to maintain buoyancy. On explosion of the mine, destruction occurs at the most vulnerable point - the ship's underbody - opening the way to great masses of water beneath it (the mine explosion can tear away the bow or stern, or make a hole in the hull with an area of several tens of square meters), leading, if not to the loss of the ship, then to great damage and a reduction in combat capabilities.

The mine also possesses a property peculiar to it alone: the ability to create a lingering hazard to navigation in broad areas. Actually, even if not a single ship is blown up in a minefield, the opponent, fearing the loss, is forced to change routes, or to discontinue navigation in the hazardous area, or to take measures to eliminate the threat of mine explosion, expending resources and materials in the process.

The scale of mine application has steadily expanded from war to war. Hence, whereas 6,365 mines were laid by the belligerents in the Russo-Japanese war (1904-1905), and 308,727 were laid in the First World War, in the Second World War over 600,000 were laid. The application of this naval weapon was rather effective: in the Russo-Japanese War, 37%; in the First World War, 38%; and in the Second World War, over 20% of all ships sunk were destroyed by mines.

At the same time that the scale of mine application expanded, it also improved: for example, methods of laying mines at various depths.

Mine detonation methods have also improved. For example, the first mines were detonated with the aid of a safety fuze, ignited on shore; then by means of electric fuzes. Later, percussion fuzes appeared, in which the impact of the ship activated the firing pin.

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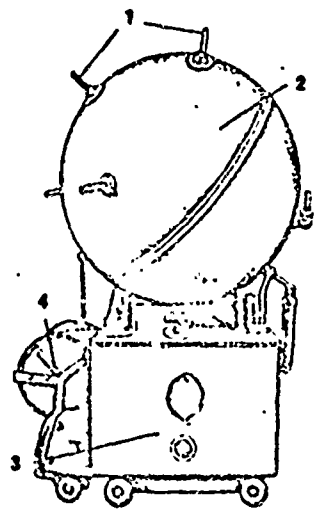
During and after the end of the Second World War, the variety of fuzes increased significantly. Besides the percussion mentioned, detonated from contact of the mine with the ship's hull, there were influence mines, reacting to the distance from a certain physical field of the ship (magnetic, acoustic, electric, etc.) or a combination of these fields. At the present time, in several capitalist countries, work is proceeding on the development of fuzes which react to such fields as thermal, photo-optical, etc. Moreover, they are trying to impart selectivity to fuzes, i.e., to make them capable of distinguishing the physical fields of one type of ship from the physical fields of other types (or enemy ships from own).

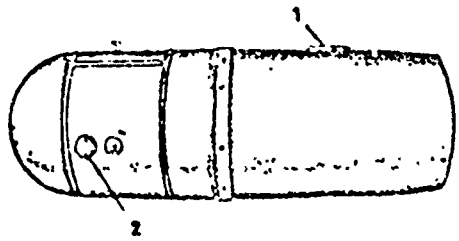


EMC moored horn mine for use against surface ships.
1) Horns; 2) Mine; 3) Anchor; 4) Reel.
Laid from surface ships.

At the beginning of the Second World War, only ground mines were provided with proximity fuzes; this limited their use to depths of 30-50 m. In the course of the War, moored mines with proximity fuzes appeared, laid at depths of up to several hundred meters. That greatly increased the mine hazard zone, both for surface ships and submarines. After the War, work was undertaken abroad to create moored influence mines to be laid in areas at depths of over 2000 m. The use of such mines will permit creation of hazardous zones not only in coastal areas, but far offshore as well.

Considerable attention is being devoted to increasing the destructive effect of mines. Whereas the mines used in the First World War had an explosive charge weighing 60-100 kg, in the Second World War they weighed up to 1000 kg. What occurred was not a simple increase in the weight of the charge, but also an increase in the power of the explosive. As we know, the first mines were simply armed with black powder, /42 but in ensuing years this was replaced with TNT and other explosives.

For a long time, the mine was considered by many foreign specialists to be a defensive weapon. In the Russian Navy it was used from the very beginning for offensive operations as well. Our seamen laid mine fields in enemy waters, in his ship anchorages, etc.



German ground influence mine for use against surface ships and submarines: 1) Guide latch; 2) Fuze.
Aircraft-laid.

Soviet naval forces adhered to the offensive nature of mine warfare in the Great Patriotic War. Thus, during the summer of 1941, Baltic boatsmen planted several clusters of mines in the Finnish skerries. On 16 September of the same year, in one of these clusters, a White Finnish flagship, the coastal defense battleship ILMARINEN, was blown up and sunk. In 1942, the Baltic submarine minelayer "L-3" (Commanding Officer: P. Grishchenko), having overcome numerous anti-submarine barriers, planted a minefield in the Bay of Pomerania (the same longitude as Berlin!), in which two large Fascist transports and a railroad ferry were blown up and sunk. For a long time, navigation in the western Baltic, considered an "inland" German sea by Hitler's high command, was paralyzed.

Our seamen operated similarly in other theaters of operation as well.

The advent of mines also governed the emergence of minelaying gear, antimine measures, an alteration in ship design and a reconsideration of basic attitudes toward the conduct of combat operations at sea.

In 1918 the first attempts were made to plant mines from airplanes, without particular success.

In the Second World War, aircraft played a leading role among minelaying forces, having been used extensively (as were submarines) to plant offensive minefields in remote enemy waters. In mining his inland waterways, aircraft proved the only suitable minelayer. British aircraft, for example, in European waters alone (including the Danube River) laid 53,300 mines, which constituted 21% of the total number of mines laid by the British, and 73.4% of their total in offensive minefields. In the Far Eastern Theater, the United States laid 25,000 mines.

Opinions are being expressed abroad lately on the possible utilization of missile submarines as minelaying submarines. In particular, it is believed that a nuclear missile submarine of the GEORGE WASHINGTON class will be able to accomodate up to 16 mines in each missile tube, i.e., up to 256 mines. This, in the opinion of American specialists, will enable it to secretly plant a minefield in several rows with a length of over 10 miles.

With the emergence of new weapons, new countermeasures are devised. Just as the advent of artillery gave rise to a defense against it -- armor -- so also the creation of

contact mines served as a cause for seeking countermeasures. Such means consisted of minesweeping gear - devices to cut the mine from its mooring, using cutters or blasting charges. (After surfacing, it is expended or destroyed by detonation of the blasting charge.) In response - in order to increase antisweep capability - mines were fitted with additional devices, which either permitted the sweep to pass through or stopped it. As a result, the mine remained joined to the anchor and a hazard to ships.

The use of influence mines led to the implementation of influence sweeps, creating physical fields which detonate the fuzes. In order to impede recovery of mines with such fuzes, during wartime they were fitted with so-called arming delay switches and ship counting devices, which armed the fuzes only upon the expiration of a prescribed period (from several hours to several days) and after the passage of a prescribed number of ships or sweeps (up to several dozen impulses). At present, the preconditions exist for the creation of percussion fuzes, which distinguish the physical fields of the sweeps from the physical fields of ships.

It is quite natural that the creation of mine countermeasures has demanded the construction of appropriate carriers. These were special minesweepers, rigged with various types of contact and influence sweeps. To combat mines, helicopters, frogmen and the latest mine detection gear were introduced in the postwar period.

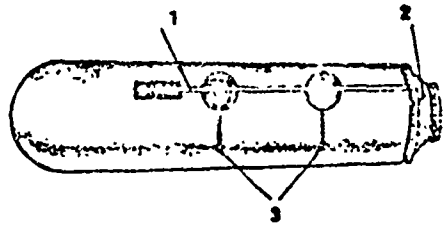
To reduce the effects of mine explosion, the design of ships' hulls was drastically altered. Compartments were created, formed by transverse and longitudinal watertight bulkheads, which enable warships and merchant vessels, with flooding of one or even several compartments, to stay afloat and perform their functions. To avoid detonating percussion fuzes beneath the ship, special measures were already being applied during the war to reduce the strength of the ship's physical fields (i.e., degaussing, "noise suppression", etc.).

The broadened scope and perfection of mining methods, as well as the continuing improvement in their combat characteristics, were responsible for the high effectiveness of this naval weapon in past wars. Thus, in the First World War, 586 vessels with a total tonnage of 1,112,000 tons GRT; and in the Second World War, about 1200 vessels with a total tonnage of 3,900,000 tons GRT, were lost to mines. It is evident that the losses were deeply felt.

Now the development of mines proceeds in the capitalist countries taking into account not only the experience of the Second World War, but also the Korean and Vietnamese wars. On the basis of advances in science and technology, new types of mines are being created, the combat characteristics of which greatly exceed the characteristics of the mines of the last world war. Thus, according to reports in the foreign press, appropriations in the U. S. for scientific research in the development of mines and mine countermeasures were increased. As a result, 17 new types of mines came into service in the U. S. Navy, over 70% of which were difficult to sweep influence mines. Among them, for example, is the MK-25 aircraft bottom influence mine (i.e., laid from aircraft) with a length of 2.21 m, diameter 0.57 m, overall weight 850 kg, and weight of charge 542 kg. It can have one of three fuzes: magnetic induction, acoustic or magnetic-acoustic. This mine is intended for destruction of surface ships and submarines. Another American moored aircraft influence mine is the MK-56 (overall weight of over 900 kg), intended for destruction of submarines. In France, the MCT-15 bottom influence mine has been developed (height 1.1 m, diameter 1.2 m, overall weight 1.5 tons, weight of charge 1 ton, magnetic hydrodynamic fuze), which is laid from surface ships for destruction of surface ships, transports and submarines.

The present great attention devoted to mines is fully understandable, since it is proven that the mine is a weapon which can have lingering, uninterrupted influence on an opponent, and which can, in combination with other weapons, substantially influence the course of military operations in a naval theater.

Soviet minemen, worthy successors of the glorious traditions of their predecessors, are developing and perfecting our own mines and the methods for their application on a new scientific-technical base. Navymen hold a formidable weapon in continuous combat readiness.



American ground influence mine for use against surface ships and submarines. 1) Safety bar; 2) Fuze apparatus; 3) Slings from safety devices. Submarine laid.